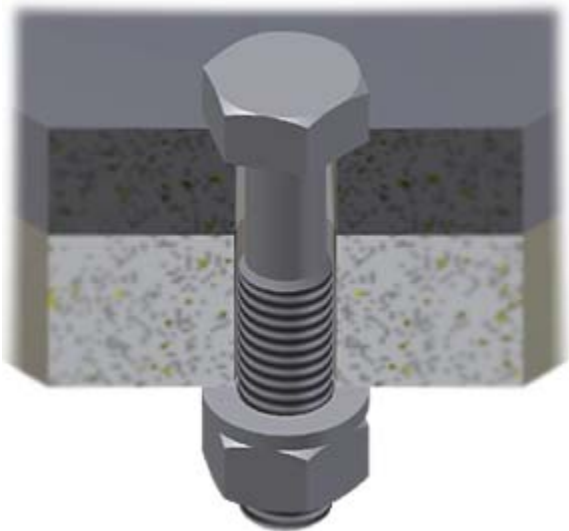


Bolted Connections

Topics in this section

- Design Bolted Connections
- Start the Generator
- Place the Holes
- Place the Holes (continued)
- Place the Holes (continued)
- Add the Fasteners
- Use Existing Hole
- Edit Bolted Connection
- Modify Hole Depth
- Change Bolted Connection Direction
- Change Configuration of Bolted Connection
- Summary

Design Bolted Connections



Category

Mechanical Design

Time Required

30 minutes

Tutorial File Used

Bolted_connection.iam (metric)

Objectives

- Create and edit bolted connections with the Design Accelerator Bolted Connection generator.

- Develop your design in a standards-based, automated fashion that saves extensive assembly and part modeling time.

Prerequisites


- Install and connect to the Content Center.
- Know how to set the active project, and navigate the model space with the various view tools.
- See the Help topic “Getting Started” for further information.

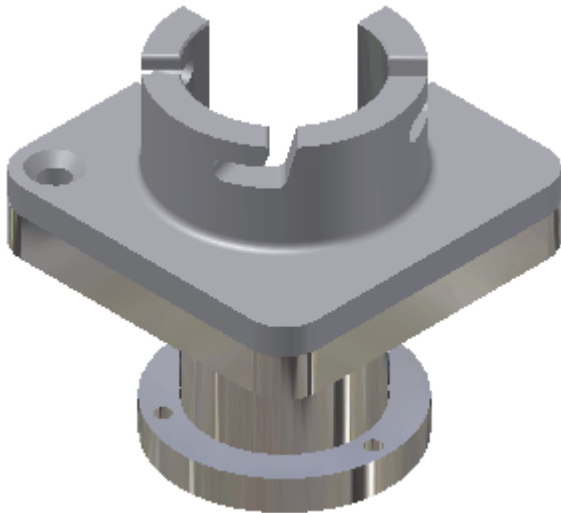
Navigation Tips


- Use **Show** in the upper-left corner to display the table of contents for this tutorial with navigation links to each page.
- Use **Forward** in the upper-right corner to advance to the next page.

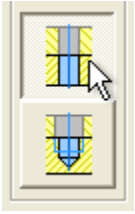
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Start the Generator

1. Set your active project to **tutorial_files**, and then open **Bolted Connection** > **Bolted_connection.iam**.
2. Click  > **Save As**.
3. For the file name, enter Bolted_connection_tutorial.iam.



4. On the ribbon, click Design tab > Fasten panel > Bolted Connection  .
5. In the Bolted Connection Component Generator dialog box, select the **Through All** hole type.

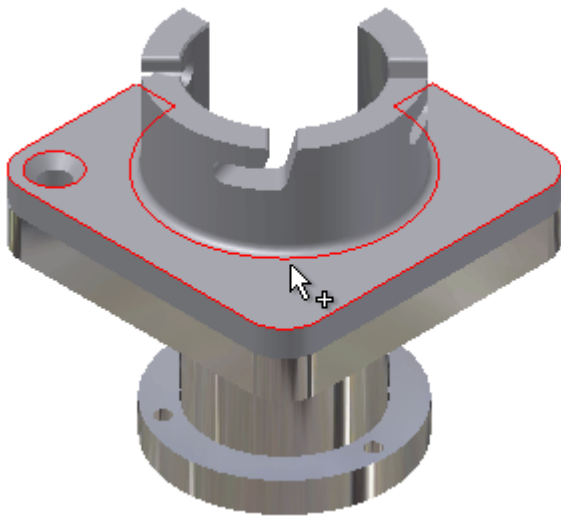


6. Select **Concentric** from the drop-down menu in the **Placement** box.
The **Start Plane** command enables.

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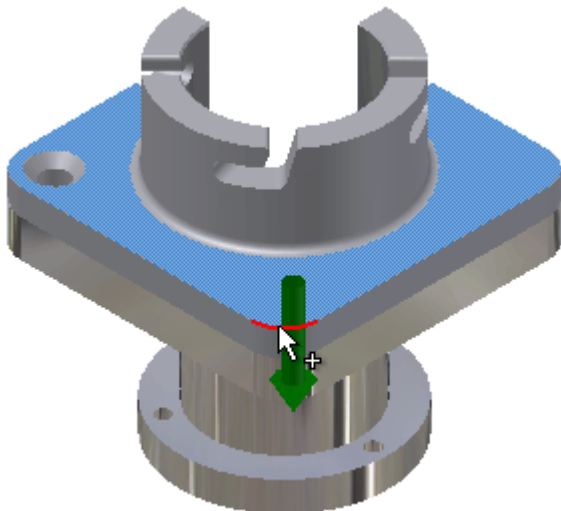
Place the Holes

1. Select the **start plane**.



The **Circular references** command is enabled.

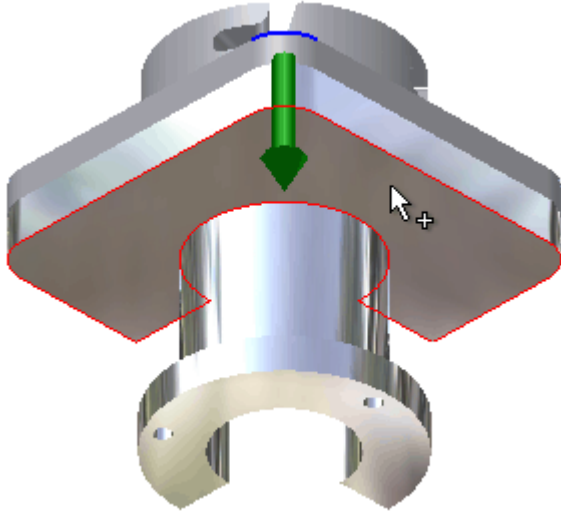
2. Select the circular edge.



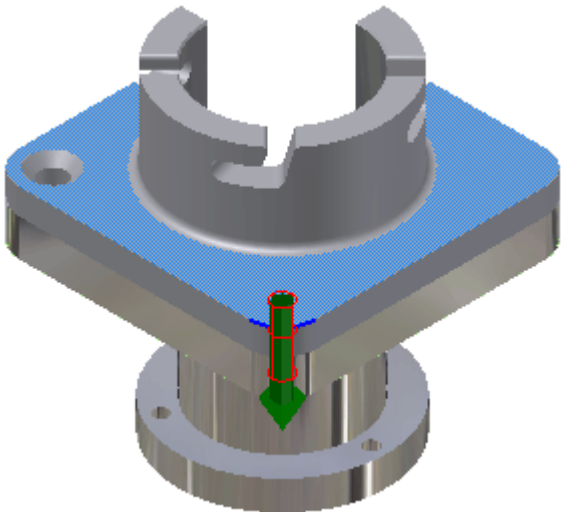
The **Termination** command is enabled.

Place the Holes (continued)

1. Orbit the assembly, and select the termination plane.



The holes preview.

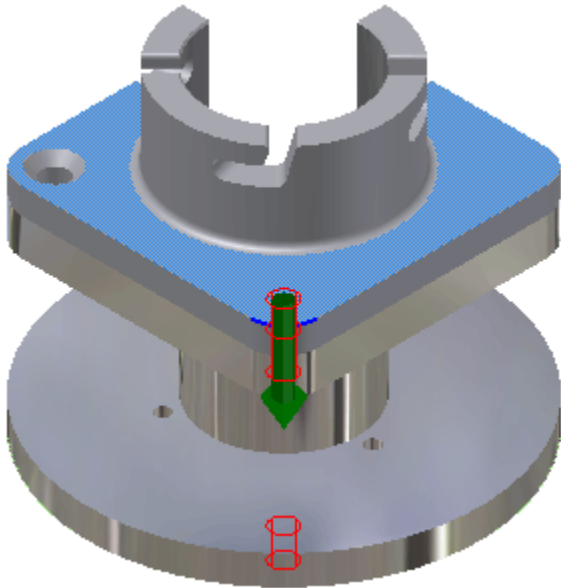


2. Verify that **6.00 mm** is selected in the **Diameter** menu.

Place the Holes (continued)

In the hole and fastener list box, notice that the program shows the hole thumbnails and descriptions. Two holes are shown, because that is the number required to pass through both components, as determined by the start and termination selections.

If another component or part feature are included in the selection, three holes are required.

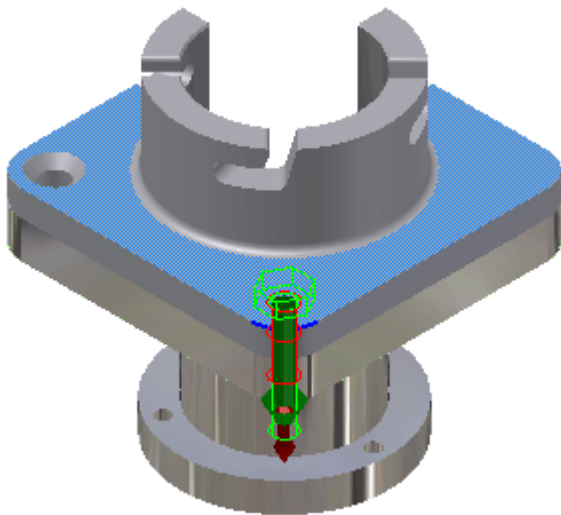


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Add the Fasteners

1. Above the hole thumbnails and descriptions, select the **Click to add a fastener** text. The available bolts display.
2. Select **ISO** from the **Standard** menu to filter the selection.
3. Select **ISO 4016**. The selected bolt previews in the graphics window.

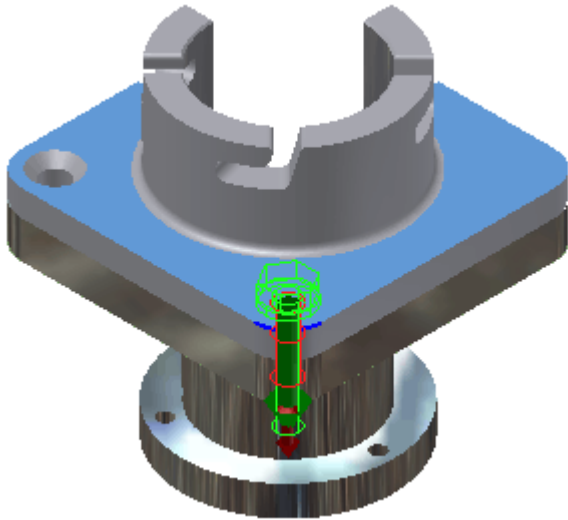
Notice also that the program selects a length long enough to pass through the chosen components automatically.



Note If your Content Center library does not contain the ISO standard, or this particular bolt, select **All** from the **Standard** menu, and then select a similar bolt.

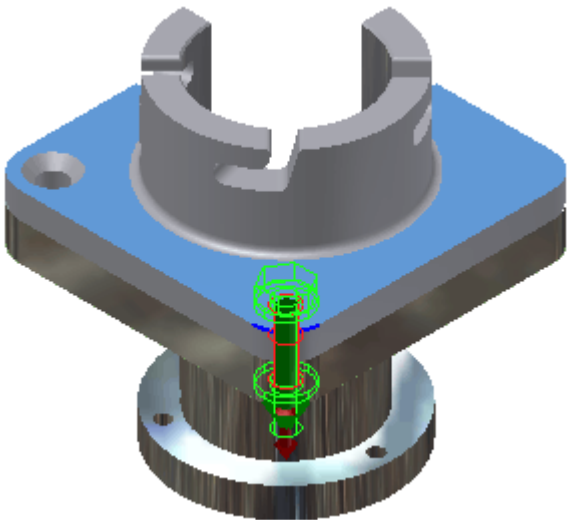
4. Select the **Click to add a fastener** text, located directly under the bolt thumbnail, and then

select **ISO 7092**.

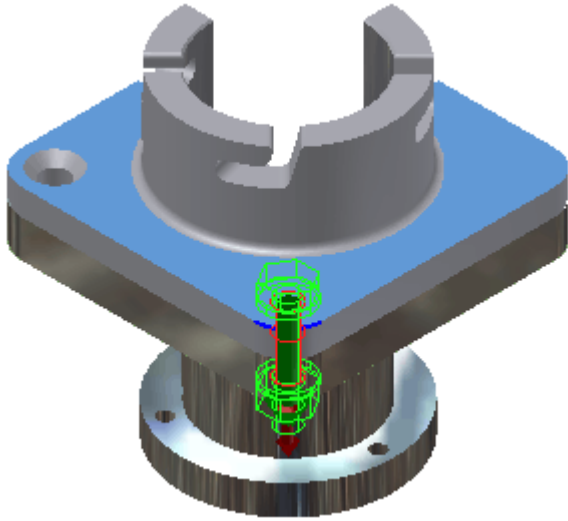


The generator logically filters the available selections. For example, when you add fastener hardware between the bolt and the top hole, the program presents only washers for selection.

5. Select the **Click to add a fastener** text located below the lower hole thumbnail, and then select **ISO 7092**.



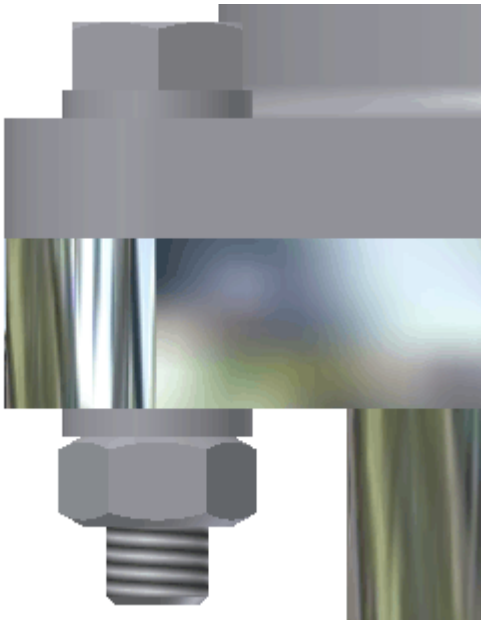
6. Click the **Click to add a fastener** text located below the lower washer thumbnail, and then select **ISO 4032**. The fastener stack is complete.



7. Click **Apply**.

The File Naming dialog box opens where you can specify the Display name of the bolted connection and the File name settings.

8. Remove the checkmark next to **Always prompt for filename** option, and click **OK**.

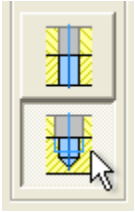


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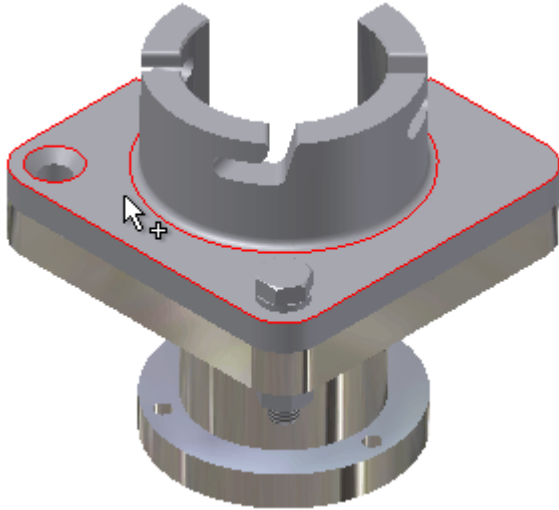
Use Existing Hole

Next, you add another bolted connection using an existing hole.

1. Select the **Blind connection type** option.

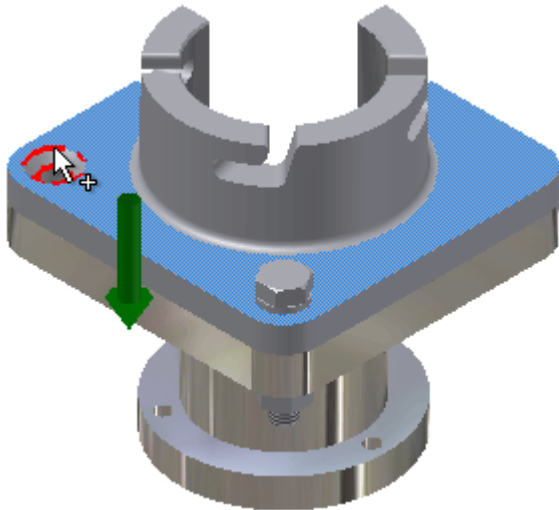


2. Select **By hole** from the drop-down menu in the **Placement** box.
3. Select the start plane.



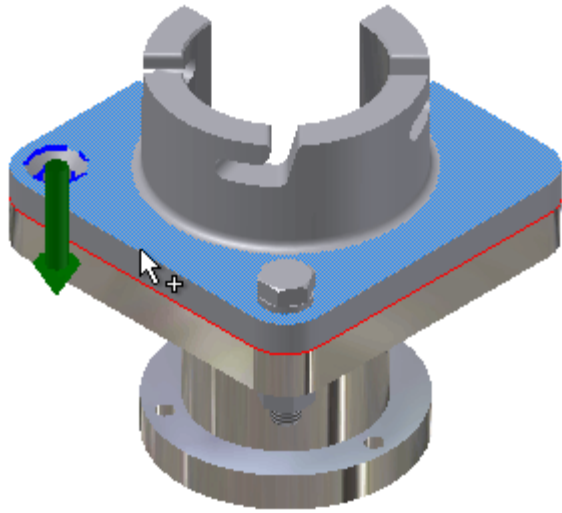
The **Existing Hole** command is enabled.

4. Select the countersunk hole.

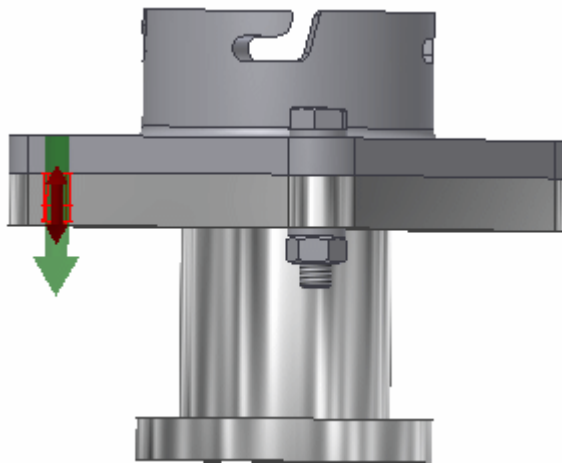


The **Blind Start Plane** command is enabled.

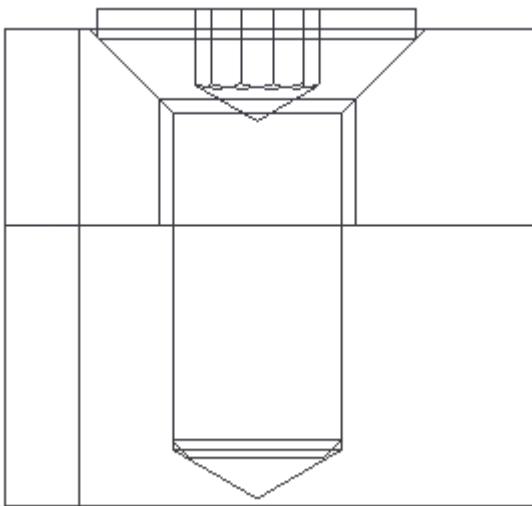
5. Select the start plane for the blind hole, which in this case is the top face of the spindle component.



The hole previews.



6. Select the **Click to add a fastener** text, and then select a countersink-type cap screw, for example, **ISO 10642**.

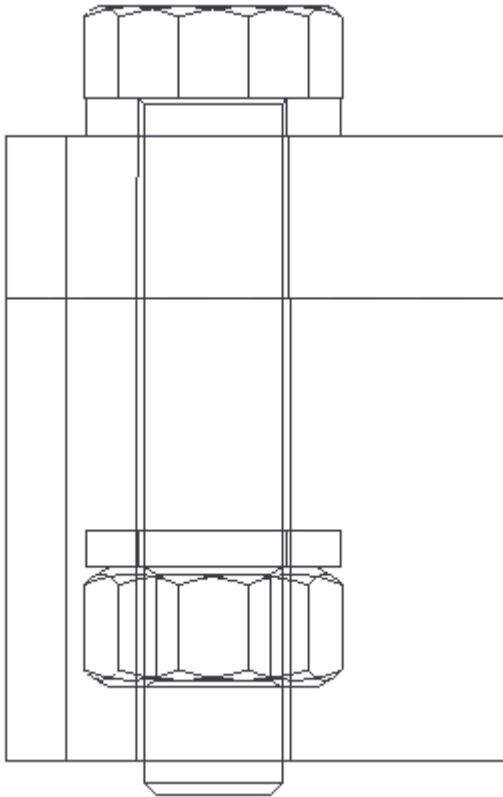


7. Click **OK**.

Edit Bolted Connection

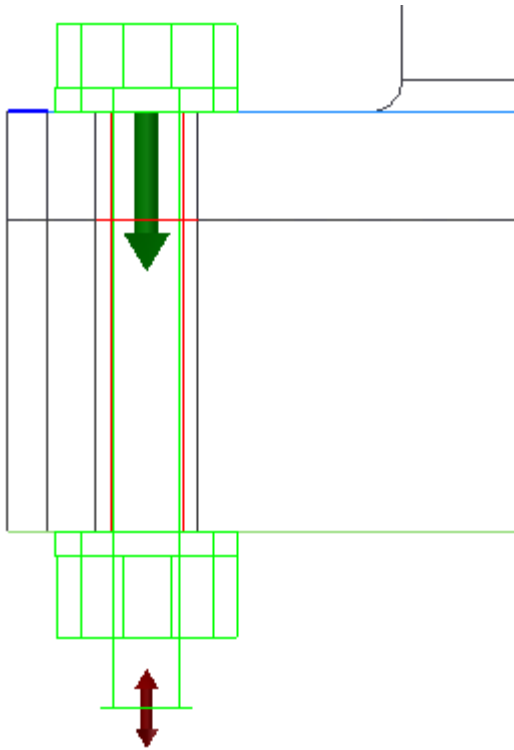
1. In the browser, double-click the **Spindle** component to edit it.
2. Click the **Parameters** command located on the **Manage** tab, and then change the value for **d4** to **20 mm**.
3. Click **Done** in the Parameters dialog box.
4. On the Quick Access toolbar, click **Return** to return to the assembly.

Notice that an update icon appears in the browser next to Bolted Connection: 1. The bolt is not long enough to make the connection and requires an update.

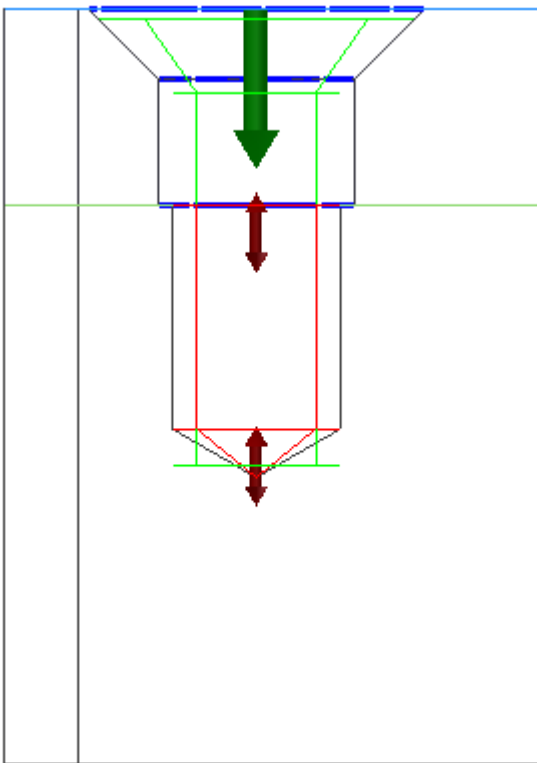


5. In the browser, right-click **Bolted Connection:1**, and then select **Edit using Design Accelerator**.

The bolted connection generator automatically previews the next available size contained in the Content Center. The preview lasts long enough to pass through the bolted components, the nut, and washers.

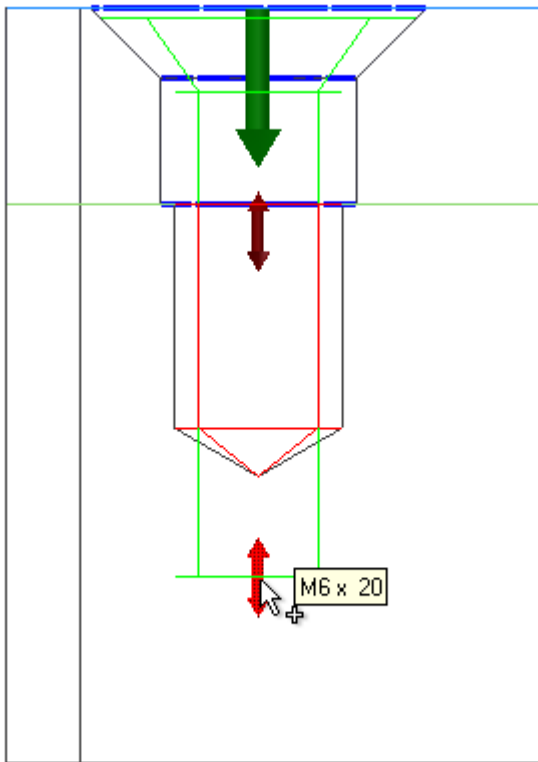


6. Click **OK**.
7. In the graphics window, right-click the cap screw contained in **Bolted Connection:2**, and then select **Edit using Design Accelerator**.
Both the cap screw and the blind hole have grip handles. You can zoom in to see the grips.



8. Drag the upper grip handle to change the length of the cap screw.
Notice that the cap screw preview snaps to the next available length contained in the available

Content Center libraries. In this example, the next available length is **20 mm**.

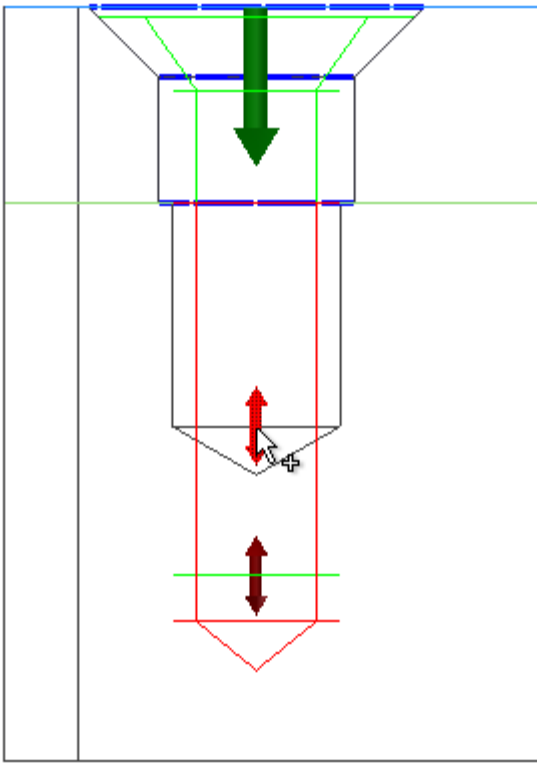


Notice also that the description text for the cap screw in the generator dialog box updates immediately as you resize the cap screw.

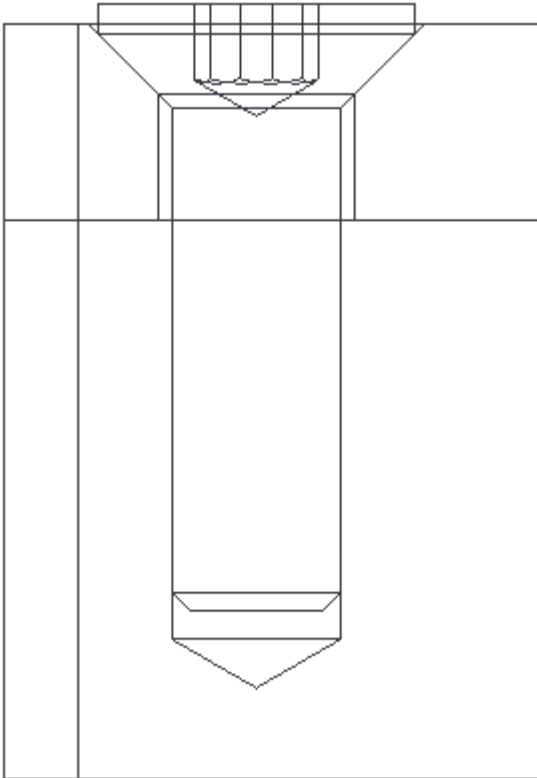
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Modify Hole Depth

1. Next, drag the grip for the hole to increase the hole depth, approximating the depth shown in the illustration.



2. Click **OK**.



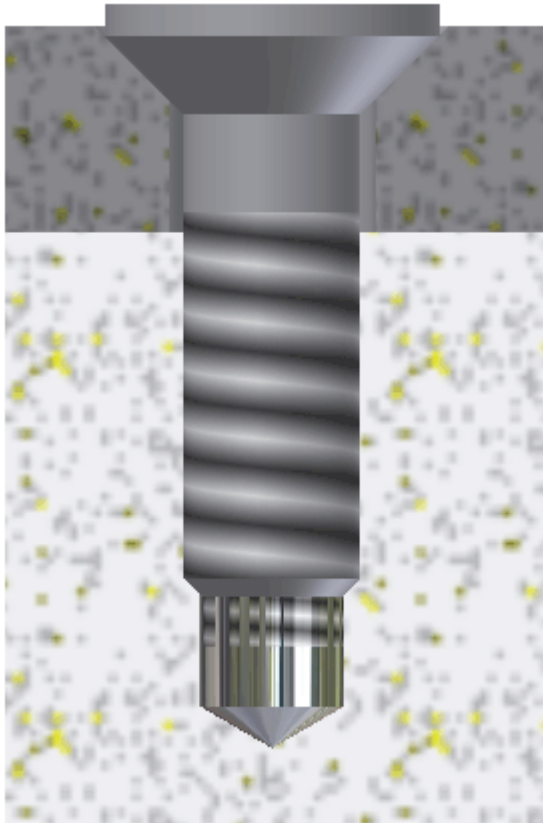
In addition to modifying the hole depth with a grip free-drag, you can precisely define the hole depth.

3. In the browser, right-click **Bolted Connection:2**, and then select **Edit using Design Accelerator**.

4. Select the lower hole thumbnail, and then click the access button next to the hole thumbnail.



5. In the Modify Hole dialog box, enter 16 mm in the **Hole Depth** field and 14 mm in the **Thread Depth** field.
6. Click the check mark to close the dialog box, and click **OK** in the generator dialog box.

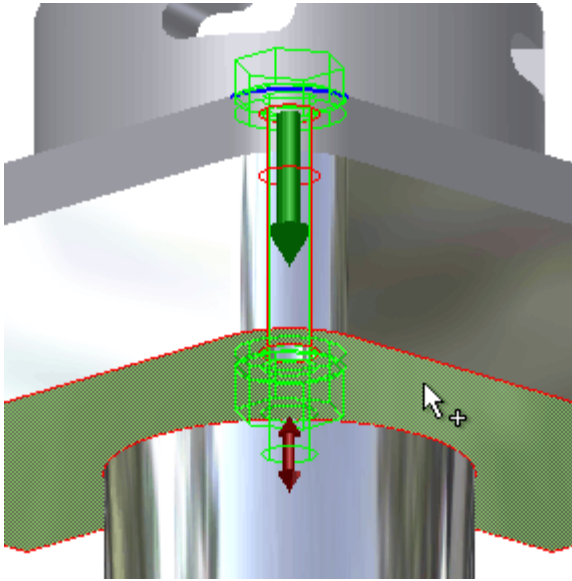


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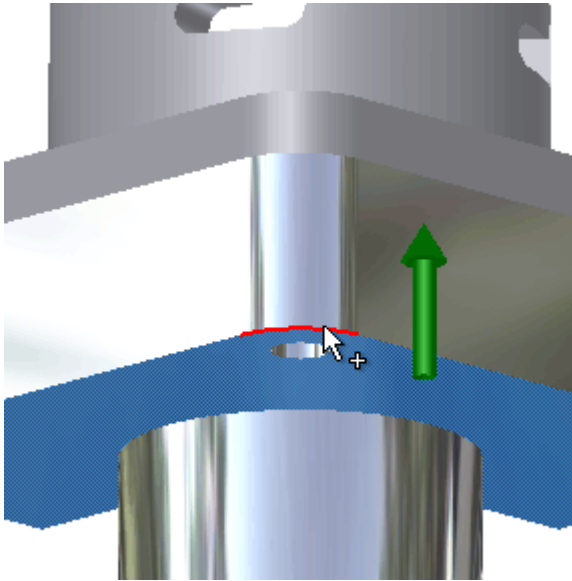
Change Bolted Connection Direction

Assume the direction for Bolted Connection: 1 must be reversed. In other words, the nut must be next to the basic_plate component.

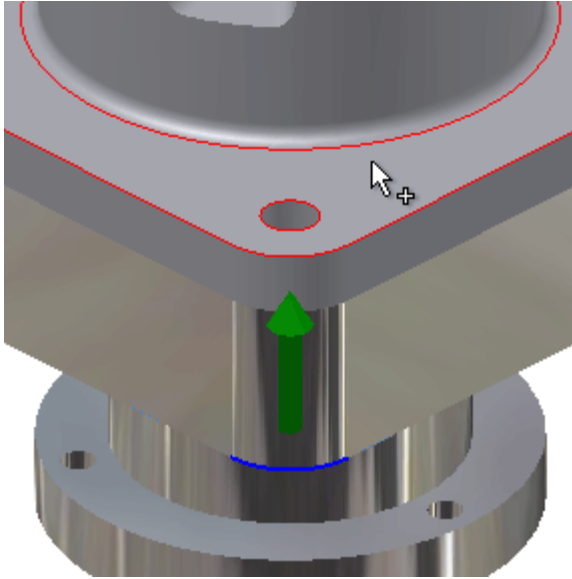
1. Right-click **Bolted Connection:1**, and then select **Edit using Design Accelerator**.
2. Click **Start Plane**, and then select the new start plane.



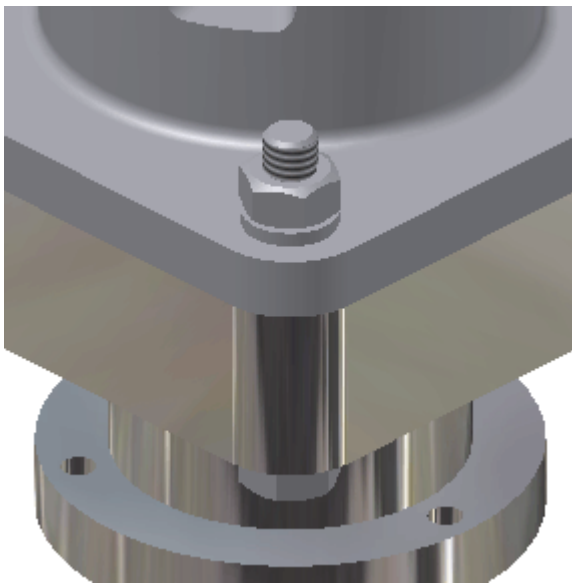
3. Click **Circular references**, and then select the circular edge.



4. Click **Termination**.
5. Select the termination plane.



6. Click **OK**.



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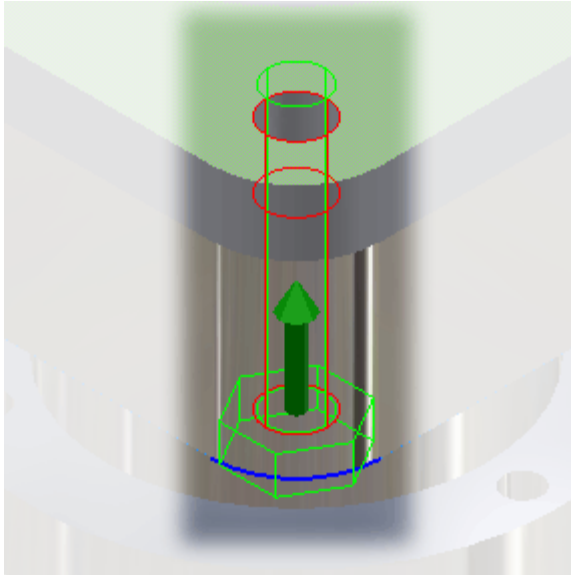
Change Configuration of Bolted Connection

Next, we change the configuration of a bolted connection.

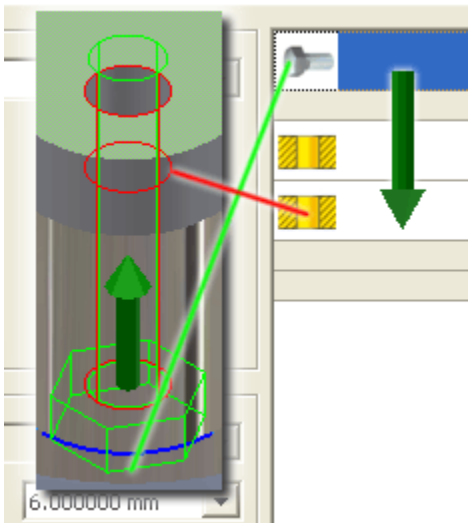
1. Right-click **Bolted Connection:1**, and then select **Edit using Design Accelerator**.

Before you continue, look at the relationship between the hardware stack in the dialog box and the direction of the connection in the graphics window.

Notice that the direction indicator in the graphics window always corresponds to the insert direction of the screw.



Though you can change the connection direction on the model, the general top-to-bottom stack order of the hardware in the dialog box remains the same. The screw is always the top-most item.



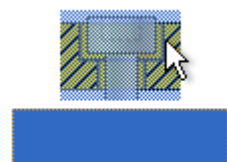
2. Select the thumbnail for the nut, and then click **Delete** to remove the nut from the connection.



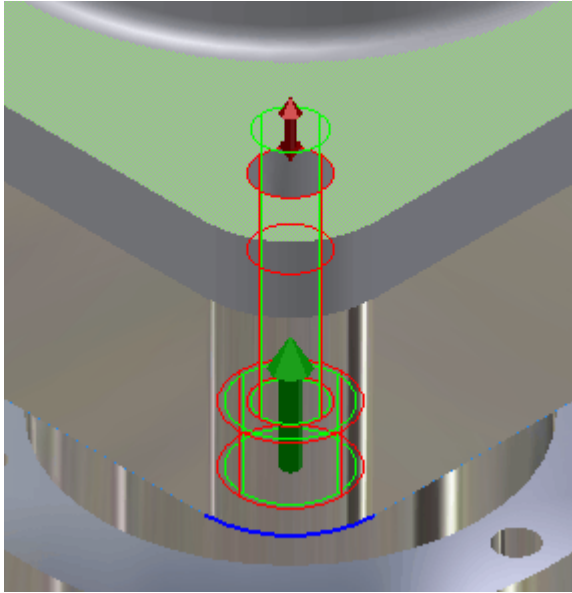
3. Use the same method to delete the two washers.
4. Select the thumbnail for the hole closest to the cap screw, and then click the menu button.



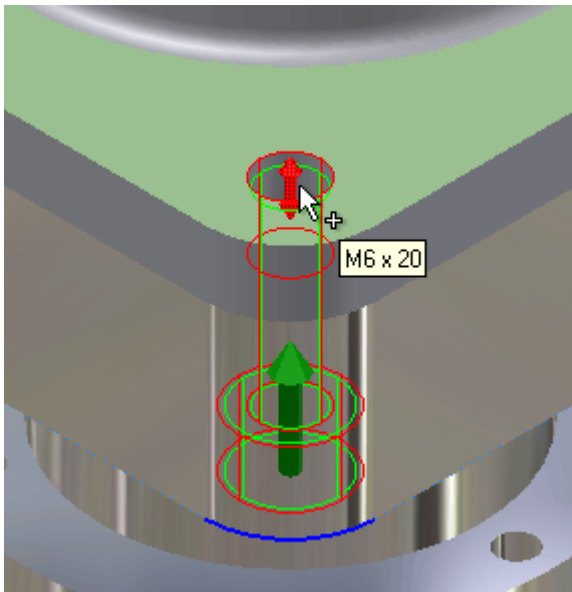
5. Select **ISO-Socket Head Cap Screw ISO 4762**.



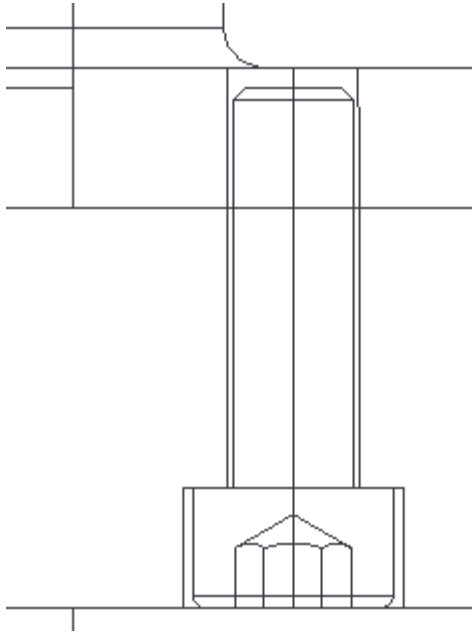
- Next, change the type of the screw. Select the thumbnail for the cap screw, and then select the menu button.
- Select **Socket Head Bolts** from the **Category** filter menu.
- Select **ISO 4762**.



- Drag the grip for the cap screw to shorten the length to **20 mm**.

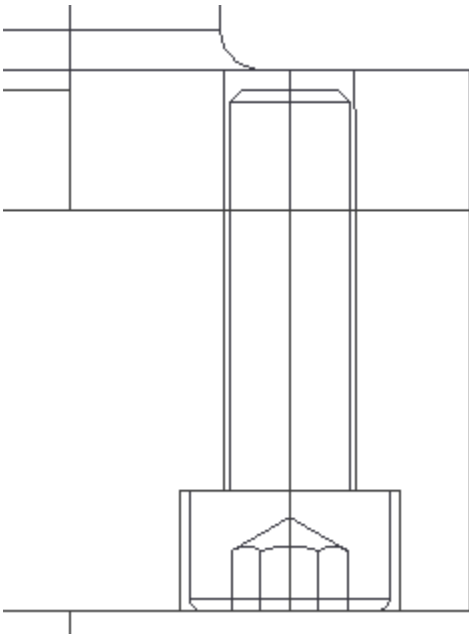


- Click **OK**.



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Summary



Using the Bolted Connection Generator, you have learned how to:

- Start a Bolted Connection.
- Place holes.
- Add fasteners.
- Use an existing hole.

- Edit a bolted connection.

You can check the Help files for further information.

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